Multi-Purpose, High Speed Centrifuge

1248R/1236R

User's Manual

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GYROZEN

Designed to suit your exact needs

Wide range of modern centrifuges for a wide variety of laboratory applications

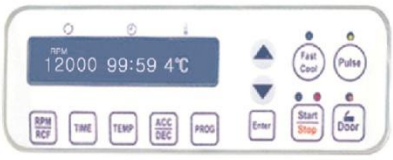
THE BEST FUNCTIONAL QUALITY

- Manufactured and tested to IEC standards, stable spinning operation within +/-2% variation
- Steady and soft deceleration with dynamic brake technology
- Unique internal air flow design that protects heating of samples
- High capacity, strong compressor ensures fast cooling of chamber and samples
- Fast cool function 4℃ in 5 minutes for fast start up and fast cool down of sample
- Automatic rotor identification functions
- Automatic RPM/RCF conversion

SAFETY and ROBUSTNESS

- Triple laminated ABS/Steel door construction minimizes noise and heat transmissions
- Safety door lock mechanism ensures the door is locked whilst in operation mode
- Unique door-drop protection protects the operator and samples when loading and unloading
- Automatic rotor identification secures operational safety
- Automatic detection and alarms for imbalance, excess speed and heating
- Automatic door-open scheme with safety level of aperture depth not to damage operators
- Emergency door-lock release helps to open the instrument when power blackout or sudden stoppage occurs
- The compressor-off function during door-open minimizes frosting and rusting
- The Aerosol tight buckets and rotors prevent contamination and ensures safety
- Autoclavable and corrosion resistant rotors ensure safety and long life
- High-quality cabinets with scratch resistant powder coated finish

CONVENIENCE IN OPERATION



- Intuitive touch button with easy to follow controls
- Easy to read LCD display with bright white lettering on a blue LCD background
- Time control of pulse, timed, and continuous
- Automatic RPM/RCF conversion for prompt detection of g-force
- Easy to check actual rpm through the top window of door
- Program memory for up to 100 programs
- Automatic rotor identification function
- Automatic door-opening function when rotor is static, for easy retrieval of samples
- A large assortment of rotors, fixed angle or swing-out with buckets and adaptors

EASY CUSTOMIZATION

- Any rotors, sample containers, and adaptors can be manufactured according to customer' s specification
- Flexibility of including any additional functions or programs in need

ECO-FRIENDLY MANUFACTURING

- Dust free AC induction motor
- Very quiet operation at lesser than 60 dB

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1. Meanings of Symbols & Safety Precautions

1-1. Meanings of Symbols

1-1-1. Symbols on the device

Symbol	Meaning	Symbol	Meaning
	Attention and warning.		Attention and warning for electric shock
	Attention and warning for rotor coupling.		Attention and warning for door opening and closing
	Attention and warning for correct way of sample balancing in the rotor.		Attention and warning for correct way of buckets position.
	Indicate a hole for manual door opening in case of emergency		

1-1-2. Symbols in this document

Symbol	Meaning	Symbol	Meaning
	This symbol refers to safety relevant warnings and indicates possible dangerous outcomes.	☞	Note. This symbol refers to the important reminder.

1-2. Safety Precautions

Before using the instrument, please read this operation manual to ensure correct usage through understanding. Incorrect handling of the instrument could possibly result in personal injury or physical damage on the instrument or its accessories.

1. ALWAYS locate the instrument on a flat, rigid and stable place capable of withstanding the weight of the instrument and its spinning operation.

2. ALWAYS make a safety zone of 30 cm around the centrifuge to indicate that neither hazardous materials nor persons should be permitted within the area during operation.

    - ✓ ALWAYS position the instrument with enough space on each side of instrument to ensure proper air circulation.

3. ALWAYS install the instrument within a temperature and humidity controlled environment. (Permissible ambient temperature: +5°C ~ +35 °C, Relative humidity: ≤ 85%)

4. Before connecting the power, check the rated voltage.

5. Should not use unapproved rotors and accessories.

    - ✓ Only use rotors from Gyrozen Co., Ltd. with appropriate centrifugal tubes and suitable adaptors to embrace sample containers tightly enough inside rotors.

6. Before operating the instrument, check if the rotor and the rotor lid are securely fastened.

    - ✓ Should operate the instrument with a rotor properly installed and secured to the motor shaft.

7. Mount the rotor on the motor shaft properly, check it with spinning manually.

8. Do not stop the rotor by touching with hand during the instrument is running.

9. Emergency door open should be performed only when spinning is completely stopped.

10. Should not exceed the rated speed or specific gravity. Samples whose density is greater than 1.2g/ml must have reduced maximum rotational speed to avoid rotor failure.

11. The sample content should not exceed 80% of total capacity of a tube. Otherwise, it would cause spillage of sample fluid and even the tube breakage.

12. ALWAYS load the tubes symmetrically with evenly weighted samples to avoid rotor imbalance. If necessary, use the water blank to counterbalance the unpaired sample.

13. The operation speed should not exceed the highest value of the individual guaranteed g-forces of each centrifuge, rotor, bucket or adaptors and sample container, especially the guaranteed g-force

of sample container should not be neglected.

14. The rotors should be cleaned and kept dry after every use for longer life and safety.

15. ALWAYS disconnect the power supply prior to maintenance care and service to avoid electrical shock.

16. ALWAYS use proven disinfection procedures after centrifuging biohazardous materials.

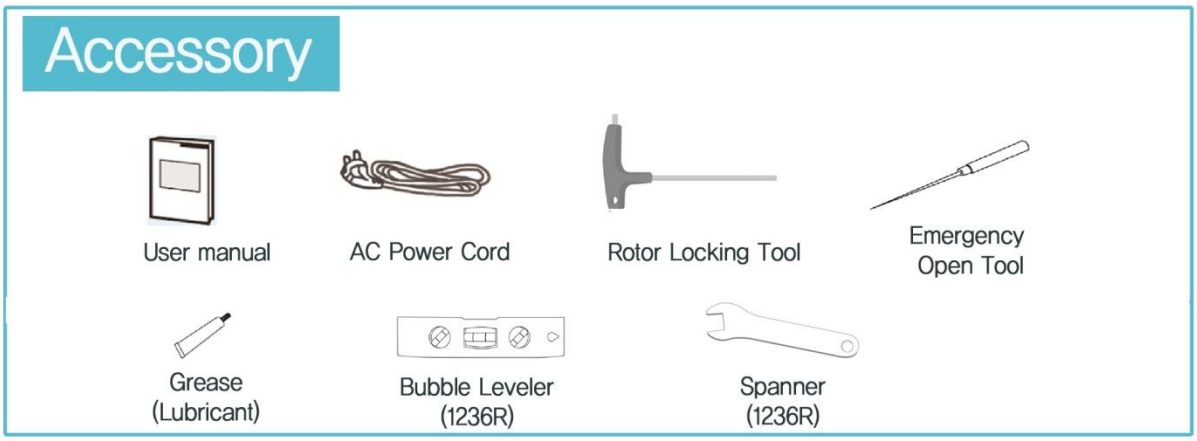
17. Should not centrifuge flammable, toxic, radioactive, explosive, or corrosive materials.

18. When it is necessary to use toxic or radioactive materials or pathogenic micro-organisms which belong to the Risk Group II of WHO: "Laboratory Bio-safety Manual," should follow national regulations.

- ✓ Do not place dangerous materials within 30 cm distance around the instrument, and that is also recommended by IEC 61010-2-020.
- ✓ Use the emergency door open function only when the door button on the control panel is dumb under the condition of complete stop of rotor running.
- ✓ Never try to open or move the instrument if it is not completely stopped.
- ✓ If the power input is more than +/- 10% of the recommended voltage or fluctuates frequently, it may affect cause malfunction of the instrument and often result serious damage.
- ✓ Install the instrument at the place without any kind of corrosive gases.

2. Product Description & Technical Specifications

2-1. Product Description



2-2. Technical Specifications

Max.RPM/RCF	Fixed angle	12,000 rpm / 16,582 xg
	Swing out	5,000 rpm / 5,394 xg
Max. capacity	Fixed angle	6 x 85 ml
	Swing out	4 x 250 ml / 250 ml conical
Temp. range(℃)		-20 ~ +40
FAST COOL button		Yes
Time control		Pulse, timed < 10 hr or continuous
RPM/RCF conversion		Yes
Noise level (dB)		≤60
Acc/Dec		9/10 steps
Program memory		100
Rotor Identification		Automation
Imbalance cutout		Yes
Display		Blue LCD
Safety lid lock		Yes
Lid drop protection		Yes
Power supply(V/Hz)		220/50~60 (110V optional)
Power requirement(KVA)		2.5
Dimension(W x D x H, mm)		473 x 600 x 840 (1236R) / 655 x 620 x 357 (1248R)
Weight without rotor (Kg)		110(1236R) / 78 (1248R)
CE mark		Yes
Cat. No.		GZ-1236R / GZ-1248R

☞ This instrument has following functions for safety.

1. Automatic rotor identification function.
2. Automatic detection and alarms for imbalance, excess speed and heating.

3. Unpacking (Only for 1248R)

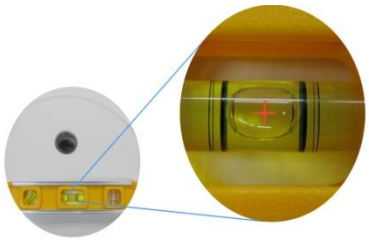
Motor Protecting Devices (3ea of screw bolts) are installed at the bottom of each instrument for keeping the motor on place. As depicted in the following pictures, the length of one bolt in the front bottom is longer than the instrument's feet for operator in order to recognize the wobbly status. These bolts and nuts should be removed before the installation of the instrument.

1. Open the box and lift out the instrument carefully.
2. Two people should keep the system horizontally to lift it up on the flat table.
3. To disassemble the Motor Protecting Devices, use the additionally supplied 6mm wrench ( ) and unscrew and remove all 3 bolts. It is now ready for installation.

☞ Place the instrument on the solid and flat table.

4. Installation

4-1. Balance Adjustment (Only for 1236R)



Imbalancing of the instrument itself causes vibration, noise and error during operation. Check the level of the floor surface with a Bubble Leveler before installation.

Action

After locating the instrument on the solid and flat floor, check the horizontality with a Bubble Leveler.

1. Place the Bubble Leveler on top of the instrument.
   - Try to locate all bubbles in the center of the Bubble Leveler with rotating the red gear which is in caster of the instrument.
2. Adjust the height of four–wheel, which is at the bottom of the instrument, with rotating the red gear (which is in caster of the instrument) for the first balance adjustment. (For the final balance adjustment, please refer to 4-4. Balance Adjustment – Final)

- For fixing a wheel: rotate the red gear counterclockwise with a spanner
- For loosing a wheel: rotate the red gear clockwise with a spanner

⚠	Place the 1248R on the solid flat table. Do not place the centrifuge on the unstable place such as moving table or cart.

4-2. Power On/Off and Door Release

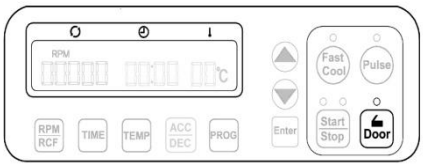
Action

4-2-1. Power On/Off

1. After connecting the AC Power cord at the power socket on the right back of the instrument, turn on the Earth Leakage Breaker Switch.
   - Check the proper power.

2. Turn on the instrument by pressing a switch on the side of instrument. (Power switch is on the left side of 1248R while on the right side of 1236R.)
   - With beeping sound, right before setting value is displayed.
   - The default values are Max. rpm, 10 min, ACC 4, DEC 4 and 25°C.

4-2-2. Door Release



1. For opening the door, touch the [DOOR] button.
   - Should touch the [DOOR] button when the door is closed (Door LED shows off).
   - Close the door until hearing clank shut.
   - When the door is opened, the door LED turns on.

☞	✓ The door is not opened while the instrument is running. ✓ If the door is opened, the instrument could not be operated even with pressing the 'Start' button. ✓ For operational safety, this instrument has the automatic rotor recognition function. ✓ When you supply the power, "Searching Rotor" /"Change to Rotor ID" will be appeared. If the rotor is absent, the "Error 9" will be appeared. This message will be cleared after rotor coupling and running. ✓ The door is not automatically opened after finishing operation to keep the sample at proper temperature. ✓ Power Failure: If there is any power failure during operation, door is not opened with 'Door' button. Door can be opened only when the operation is completely stopped and the power is on again. If you want to open the door at the power failure, please refer to '5-9. Emergency Door Open'.

4-3. Rotor coupling and disassembling

Action

1. Before coupling a rotor, clean the motor shaft and chamber with soft dry towel.

4-3-1. Swing-Out Rotor

2. Mount a proper rotor into the motor shaft.
3. Grasp the rotor with one hand, and place Rotor Locking Tool at the center hole of the rotor.
    - ➢ To assemble the rotor: Rotate the Rotor Locking Tool clockwise until tightly assembled.
    - ➢ To disassemble the rotor: Rotate the Rotor Locking Tool counterclockwise.

4. Hang the appropriate buckets into the rotor.
    - ➢ Load the identical bucket at each wing for safety. (Do not leave a vacant wing without a bucket. All wings should hold identical bucket.)
    - ➢ Remove dirt and water drop around hooks of rotor and hanging part of bucket.
5. Spin the rotor manually to check if bucket swinging is free enough and ever. If they do not swing freely, apply the Lubricant (grease) to the linking area.

4-3-2. Fixed Angle Rotor

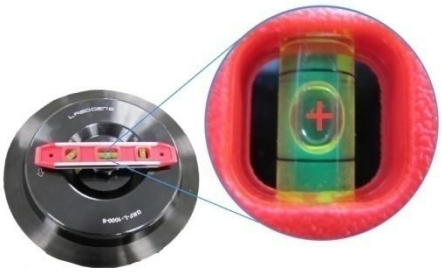
2. Mount a proper rotor into the motor shaft.

   Grasp the rotor with one hand, and place the Rotor Locking Tool at the center hole of the rotor.
    - ➢ To assemble the rotor: Rotate the Rotor Locking Tool clockwise until tightly assembled.
    - ➢ To disassemble the rotor: Rotate the Rotor Locking Tool counterclockwise.

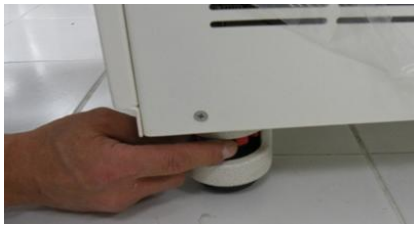
3. To close of the rotor lid, rotate the rotor lid nut clockwise.
    - ➢ For opening the lid: rotate the rotor lid nut counterclockwise.

When you run a fixed angle rotor, make sure that the rotor lid is tightly closed. If you don't close the rotor lid completely, it will be crushed.

4-4. Balance Adjustment – Final (Only for 1236R)



1. Mount the rotor and place the Bubble Leveler on the middle of the top of a rotor.
   - ➢ Confirm that air bubbles of all three windows of the Bubble Leveler are within the black lines.

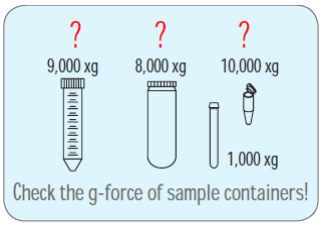


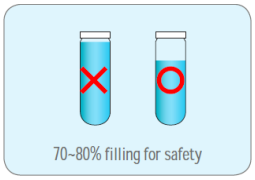
2. To adjust the balance status, rotate the red gear at the wheel caster clockwise or counterclockwise until the device is well balanced.

4-5. Positioning of Sample Tubes

1. Before loading sample tubes, check the water drop or dirt in the rotor hole or inner adaptor.
   - ➢ If there is a water drop or dirt in the rotor hole or inner adaptor, remove it with soft dry cloth.
2. Tubes should be placed in the rotor with same amount of samples at symmetrical positions.
   - ➢ Only use appropriate centrifugal tubes and do not exceed the speed beyond the tube's max. g-force.
   - ➢ For safety, fill the sample for 70~80% in the tubes.

Correct Way of Sample Balancing & Tube Usage



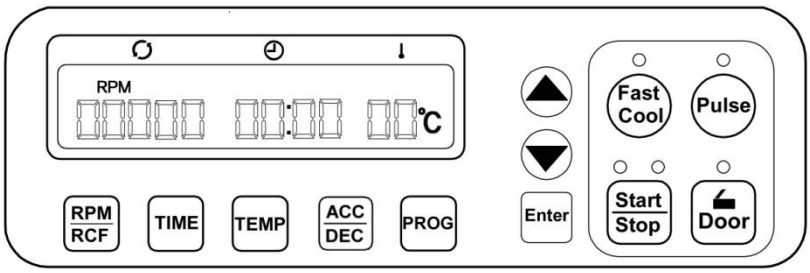


- ✓ If the number of samples is not in pair, please load the control tubes at each symmetrical position. Otherwise, it results noise and vibration, which eventually damage the instrument.

☞ For safety, the 'Imbalance Cut Off' function will be occurred, if there is imbalance of loading tubes (Error 8, Imbalance error). Please refer to 7. Trouble Shooting.

5. Operation

5-1. Key Functions of Control Panel



☐ RPM/RCF — For automatic conversion of RPM/RCF and to set the speed

☐ TIME — Use to set time, available range up to 9 hour 59 min (00:00: continuous)

☐ Temp — Use to set temperature (-20°C ~ 40°C)

☐ ACC/DEC — Use to set the acceleration & deceleration level from 1 to 5 steps. '0' in deceleration step means natural deceleration. Larger number means faster acceleration or deceleration.

☐ PROG — Use to save a set of setting values or recall the saved program number

☐ Fast Cool — Use to reach rapid refrigeration up to the setting temperature.

☐ Pulse — Use for quick runs

☐ Enter — Use for completion of data setting

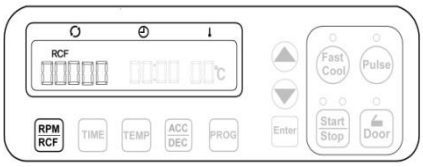
☐ Start/Stop — Use to start and stop operation

☐ Door — Use to open instrument lid

5-2. Setting RPM/RCF

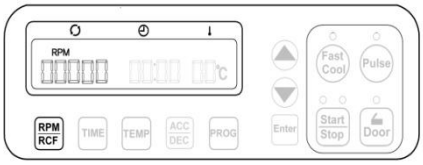
Action

5-2-1. Setting RPM

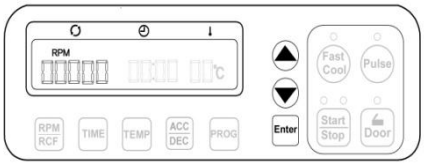


▶ Speed setting unit: 10 rpm or 100 rpm.

1. Touch the [RPM/RCF] button once.
   - ➢ RPM MODE is generated by touching [RPM/RCF] button once.
   - ➢ RPM LED is flickering on the display window.

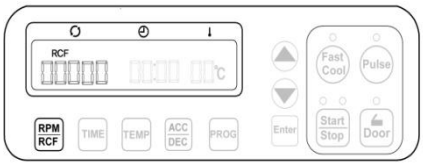


2. Touch the [▲▼] buttons to change input value.
   - ➢ After keeping holding finger on the [▲▼] buttons for 5 seconds, the unit of setting value is changed to 100 rpm from 10rpm.
   - ➢ If you do not touch the [▲▼] button for 5 seconds, the setting mode is cleared.



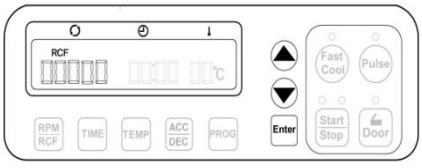
3. Touch the [Enter] button to complete the setting.
   - ➢ Touch [Enter] to save the setting value.

5-2-2. Setting RCF



▶ Speed setting unit: 1 rcf or 10 rcf

1. Touch the [RPM/RCF] button twice.
   - ➢ RCF MODE is generated by touching a [RPM/RCF] button twice.
   - ➢ RCF LED is flickering on the display window.

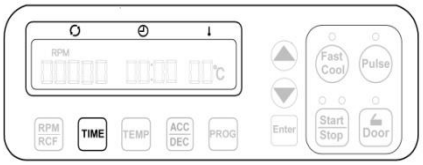


2. Touch the [▲▼] buttons to change input value.
   - ➢ After keeping holding finger on the [▲▼] buttons for 5 seconds, the unit of setting value is changed to 10 rcf from 1 rcf.
   - ➢ If you do not touch the [▲▼] button for 5 second, the setting mode is cleared.
3. Touch the [Enter] button to complete the setting.

5-3. Setting Time

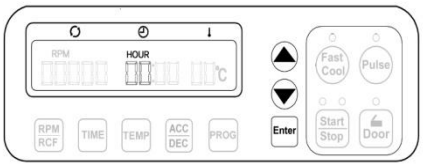
▶ Speed setting unit: 1 hr./ 1 min. or 10 min.

Action

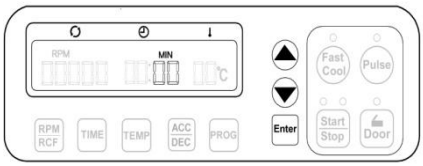


✓ Time is down-counted after starting centrifugation.

1. Touch the [TIME] button once.
   - ➢ 'HOUR' is appeared on the display window.



2. Touch the [▲▼] buttons to change the hour value.
   - ➢ If you do not touch the [▲▼] button for 5 seconds, the setting mode is cleared.
3. Touch the [Enter] button to pass the 'MIN' value setting.
4. Touch the [▲▼] buttons to change the minute value.
   - ➢ After keeping holding finger on the [▲▼] buttons for 5 seconds, the unit of setting value is changed to 10min from 1min.
   - ➢ If you do not touch the [▲▼] button for 5 second, the setting mode is cleared.



5. Touch the [Enter] button to complete the setting.

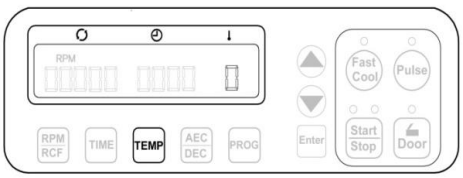
5-4. Setting Temperature and Fast Cool

Action

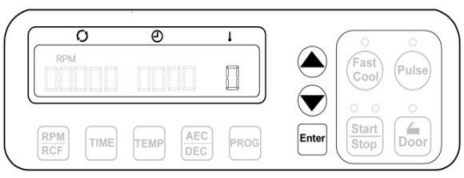
5-4-1. Setting Temperature

▶ Temperature can be set from -20℃ to 40℃

▶ Temp setting unit: 1 ℃

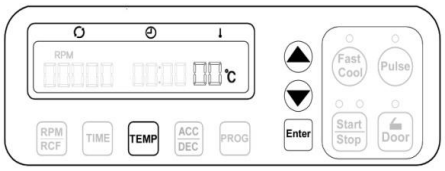


1. Touch the [TEMP] button.
   - ➢ Temperature value blinks on the display window.
2. Touch the [▲▼] buttons to change input value.
   - ➢ If you do not touch the [▲▼] button for 5 second, the setting mode is cleared.

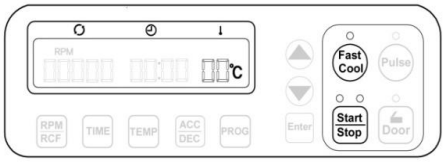


3. Touch the [Enter] button to complete setting.

5-4-2. Fast Cool



1. Setting the temperature. (Please refer to 5-4-1. Setting Temperature)
2. Touch the [Fast Cool] buttons for fast cooling.
   - ➢ 'Fast Cool' on LED is turned on.
   - ➢ The display shows a message: "Searching Rotor" >> "recognition OK!"
   - ➢ By touching the [Fast Cool] button, the instrument is refrigerated down to the set temperature in a short time. During the fast cooling, the rotor runs at low speed (1,000 rpm).
   - ➢ The passed time is showed on the display window.

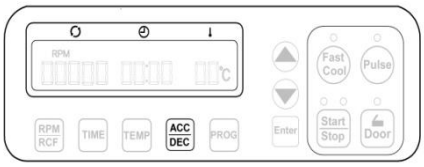


☞
- ✓ If you'd like to load your sample tubes before pressing the [Fast Cool] button, please check if the sample is safe during spinning at 1,000 rpm.
- ✓ Before starting Fast Cooling, please check the rotor coupling and symmetry of sample tubes.

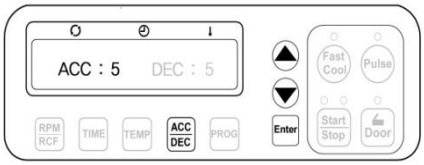
5-5. Acceleration / Deceleration

▶ Use the adjustment function of acceleration & deceleration levels to protect sensitive samples.

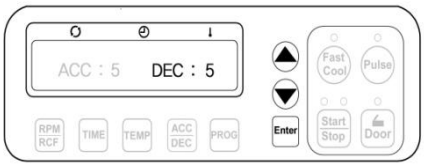
Action



1. Touch [ACC/DEC] button.
2. Touch the [▲▼] buttons to change input ACC value.
   - ➢ ACC blinks on the ACC/DEC display.
   - ➢ Input the desired level of ACC from 1 to 9. (Level 9: The fastest acceleration)
   - ➢ If you do not touch the [▲▼] button for 5 second, the setting mode is cleared.



3. Fix the ACC level by touching [Enter] button.
4. Touch the [▲▼] buttons to change input DEC value.
   - ➢ DEC blinks on the ACC/DEC display.
   - ➢ Input the desired level of DEC from 0 to 9. (Level 0: Natural deceleration / Level 9: The fastest deceleration)
   - ➢ If you do not touch the [▲▼] button for 5 seconds, the setting mode is cleared.

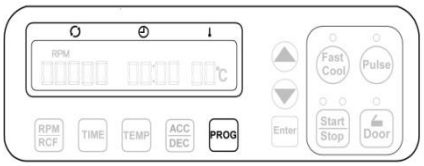


5. Fix the DEC level by touching [Enter] button.

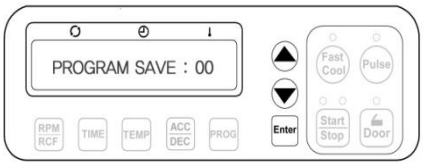
5-6. Program Saving & Recalling

Action

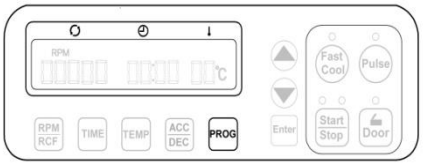
5-6-1. Saving



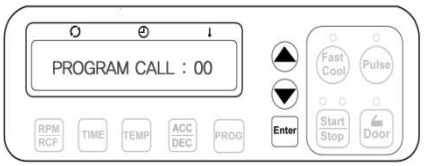
1. Set parameters. (Refer to 5-2. ~ 5-4.)
2. Touch the [PROG] button longer than 3 seconds.
   - ➢ Check the message of "PROGRAM SAVE: ##" on the display window.
3. Touch the [▲▼] buttons to change input Program number.
   - ➢ If you do not touch the [▲▼] button for 5 seconds, the setting mode is cleared.
   - ➢ Save up to 100 programs (Program numbers from 00 to 99)
4. Touch the [Enter] button to complete the saving.



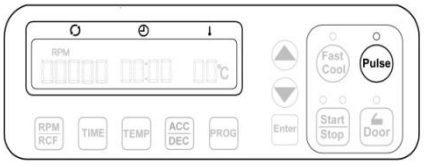
5-6-2. Recalling



1. To recall the saved program, just touch the [PROG] button shortly (less than 1 sec.).
   - ➢ Check the message of "PROGRAM CALL: ##", on the display window.
2. Touch the [▲▼] buttons to select program number you want to recall and then touch the [Enter] button.
   - ➢ If you do not touch the [▲▼] button for 5 seconds, the setting mode is cleared.
   - ➢ When you touch the [Enter] button, display window shows the saved setting parameters (RPM/RCF, TIME, and TEMP).



5-7. Pulse



▶ It is for quick and short spin down.

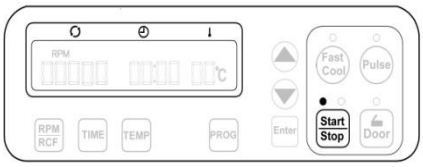
Action

1. If you touch the [Pulse] button and release at the point you want to stop, the centrifuge decelerates immediately.

5-8. Start/Stop

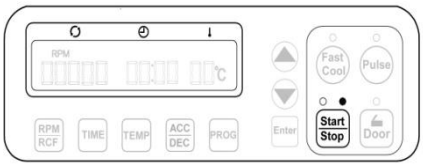
Action

5-8-1. Start



1. After setting RPM/RCF, Time and Temp., touch [Start/Stop] button.
   - During running, a 'Start LED' is turned on.
   - The instrument is running only when the door is closed.

5-8-2. Stop



1. In case of touching the [Start/Stop] button, the operation is stopped.

5-9. Emergency Door Open

For emergency door opening, you can use the Emergency Door Open Tool only when the instrument is completely stopped.

The door can be unlocked manually with the Emergency Door Open Tool through the emergency door opening hole.

1. Find the emergency door open hole on the left side of the instrument.
2. Insert the Emergency Door Open Tool into the hole and push it until the door is released.

> ⚠ Manual opening should be performed only when spinning is completely stopped. Otherwise, harmful damage will be accompanied to not only operators but samples.
> After opening the door manually, it is recommended to wait until normal electricity comes back.

6. Maintenance

6-1. Outer part of instrument

1. Clean the outside of the instrument with dry soft cloth. If necessary, dip the cloth in neutral detergent and clean contaminated area. Keep completely dry after cleaning.
2. Do not use any volatile chemicals such as alcohol and benzene, etc.
3. Be careful not to make scratches on the surface of the instrument. The scratches can cause corrosion on the surface of the instrument.

✓ If any rust appears, clean it with neutral detergents and keep dry.

6-2. Chamber

1. Keep dry inside the chamber after every use.
2. If the chamber is contaminated, dip the cloth in neutral detergent and clean contaminated area.

6-3. Shaft

1. Always make special attention to clean the motor shaft to avoid any imbalance problem due to the contaminants.
2. After using the instrument, take out the rotor from the shaft, and clean the shaft with dry soft cloth to keep dry.

6-4. Rotor

1. If any parts are contaminated with samples, clean the rotor with soft wet cloth and keep the rotor dry.
2. Be careful not to make scratches inside or on the surface of rotors. Any small scratches can cause corrosion of the rotor and big damage to the instrument.
3. If you do not use the instrument, keep the rotor separately from the motor shaft and stand it upside down.

6-5. Transportation of Instrument

1. If you need to move or ship the instrument, be cautious to protect the motor shaft from any physical impact or turbulence.
2. Do not mount a rotor in any cases of movement. Fill inside the chamber with proper materials to keep the motor shaft on place and not to be influenced by physical pressure.

7. Trouble Shooting

7-1. Check list

Symptom	Check list
Power failure	Connect the AC Power cord and make sure that the line is completely connected between the instrument and power outlet. Check the power switch is turned on. (Please refer to 4-2. Power On/Off and Door Release)
Can't be started	If the door is not closed completely, the instrument can't run. Check the Door LED on the display window and close the door completely.
Can't open the door	If the power is out, check the main fuse for the laboratory to supply the power. If it is not solved in shortly, open the door with Emergency Door Open Tool manually for safety of sample. (Please refer to 5-9. Emergency Door Open)
Can't close the door	Remove the dirt at the door latch and then close the door completely again. If the door seems not being closed by mechanical reason, please contact our service team.
Noise and vibration during running	Please check the balanced status of both the table and the instrument.
	Please re-check the coupling status of the following three matches to minimize the noise 1. the balanced way of coupling of the rotor into the motor shaft 2. the completeness of fixing of the Rotor Locking Nut on the rotor 3. the matching status of Rotor Lid with the rotor (Please refer to 4-3. Rotor Coupling and Disassembling)
	Check balances of samples in the rotor. (Please refer to 4-5. Positioning of Sample Tubes) and load the same weight of samples symmetrically.

7-2. Error Code

If the instrument shows the error code with beeping sound, press [STOP] button to stop the beeping sound and press [Enter] button to release of the error status and make the instrument go to the default setting again.

Error	Possible Causes	Actions
Error 1	RPM Sensor	- Shut off the power supply, and then, turn on the power switch again to check the instrument. - If the error code shows continuously although you try to operate again, please contact us.
Error 2	Door	- If the door is not closed completely, this message is appeared. -Remove the dirt at the door latch and then close the door completely again. Check the Door LED on the display window. If it is not solved in shortly, open the door with emergency door tool manually for safety of sample. (Please refer to 5-9. Emergency Door Open)
Error 3	Motor Overheating	- If the motor is overheated, this message is appeared. -Shut off the power supply for an hour, and then turn on the power switch for checking the instrument. - If the error code shows continuously, please contact us.
Error 4	Low Voltage	- If the power input of Power supply (V/Hz) is 10% less than required power, this message is appeared. - Shut off the power supply and then check the voltage of the Power supply (V/Hz). - Use AVR to provide proper power.
Error5	High Voltage	- If the power input of Power supply (V/Hz) is 10% more than required power, this message is appeared. - Shut off the power supply and then check the voltage of the Power supply (V/Hz). - Use AVR to provide proper power.
Error 6	Over Speed	- If the instrument is spun with over speed, there will be some problems in the overload of motor and the output of motor. - Shut off the power supply, and then, turn on the power switch again to check the instrument.
Error 7	Software	- If the installed software has bugs, this message is appeared. - Tuning the firmware (Download)*
Error 8	Imbalance	- Check weight-balances of samples (Please refer to 4-5. Positioning

		of Sample Tubes) and then turn off and on the instrument for checking.
Error 9	Rotor ID or RPM Sensor	- If the function of rotor recognition is failed, this message is appeared. - This message will be cleared by coupling an appropriate rotor (Please refer to 4-4. Rotor coupling and disassembling.) - If the error code shows continuously, please call Gyrozen Field Service Engineer.
Error 11	Chamber Temp. Error	- If the instrument is not reached to setting temperature within an hour, this message is appeared. - No user action. Please call Gyrozen Field Service Engineer.
Error 12	Temp. Sensor Error	- If there is a faulty in the temperature sensing of chamber or over heated, this message is appeared. - No user action. Please call Gyrozen Field Service Engineer.
Error 15	Motor Temp. Sensor	- If the motor temperature sensor can't recognize, this message is appeared. - No user action. Please call Gyrozen Field Service Engineer.
Error 16	Comp. Temp. Sensor	- If the temperature of compressor is over heated up, this message is appeared. - No user action. Please call Gyrozen Field Service Engineer.

* Any wire disconnection or tuning of the instrument must be performed only by a service engineer who is authorized by GYROZEN Co., Ltd.

7. Rotors & Accessories

Swing Rotor, GRS-G-100-6

6 loadings
∧ 90°

Bioseal Bucket with O-ring

Bioseal 100 mℓ Bucket GLB-b100-100
Bucket bore (ΦxL, mm) : 47 x 99
Radius(mm) : 173.6
Max. RPM : 4,000
Max. RCF(g-force) : 3,105
Max height for tube fit(mm) : 117(w/ cap) / 130(w/o cap)

Tube										
Tube capacity(mℓ)	1.5~2.0	2.6~7	4~10	9~15	15 mℓ conical	15 mℓ conical	50	50 mℓ conical	85	100
Tube rack										
Cat. No.	GAM-m2.0-6 (b100)	GAM-7-5 (b100)	GAM-10-5 (b100)	GAM-15-3 (100)	GAM-c15-3 (100)	GAS-c15 (b100)	GAS-50 (b100)	GAS-c50 (b100)	GAS-85 (b100)	GAS-100 (b100)
Rack capacity(ea/6)	6/36	5/30	5/30	3/18	3/18	1/6	1/6	1/6	1/6	1/6
Hole dimension (ΦxL, mm)	11 x 39	13.5 x 60	16 x 60	17.5 x 105	17.2 x 106.5	17.2 x 106.5	29.5 x 95.9	30 x 100	38 x 96.4	44 x 106.4

* (b100) adaptors work fine with bioseal capping but [100]

Vacuutainer Bucket

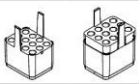
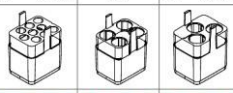
Vacuutainer100 mℓ Bucket GLB-10-8-100
Bucket capacity : 8/ea
Bucket bore (ΦxL, mm) :16 x 89
Radius(mm) : 173.6
Max. RPM : 4,000
Max. RCF(g-force) : 3,161
Max height for tube fit(mm) : 114

Tube	
Tube capacity(mℓ)	10
Bucket capacity (ea/6)	8/48

Swing Rotor, GRS-G-r250-4

4 loadings
90°

Rectangular 250 mℓ Bucket GLB-r250-r250
Bucket bore (wxdxh, mm) : 86 x 70.3 x 98.5
Radius(mm) : 175.2
Max. RPM : 4,000
Max. RCF(g-force) : 3,134
Max height for tube fit(mm) : 125

Tube										
Tube capacity(mℓ)	3	5	10	15	15 mℓ conical	50	50 mℓ conical	15	85	250
Tube rack										
Cat. No.	GAM-5-12(r250)		GAM-15-12(r250)		GAM-c15-9 (r250)	GAM-50-4 (r250)	GAM-c50-3 (r250)	GAM-85-2(r250)		GAS-250(r250)
Rack capacity(ea/4)	12/48		12/48		9/36	4/16	3/12	2/8		1/4
Hole dimension (Φx L, mm)	13.5 x 58	13.5 x 80	17.5 x 90		17.5 x 90	30.2 x 90	30.5 x 90	17 x 90 / 38.5 x 90		62.5 x 87

Microplate Holder GLP-mw-r250
Holder dimension (wxdxh, mm) : 88 x 128.5 x 80
Radius(mm) : 153
Max. RPM : 4,000
Max. RCF(g-force) : 2,737

Plate		
Plate capacity(mℓ)	MTP	DWP
Holder capacity(ea/4)	4/16	1/4

Swing Rotor, GRS-G-c250-4

4 loadings
∧ 90°

Conical 250 mℓ Bucket GLB-c250-c250
Bucket bore (ΦxL, mm) : 60.5 x 130.2
Radius(mm) : 193
Max. RPM : 5,000
Max. RCF(g-force) : 5,394
Max height for tube fit(mm) : 147

60 mℓ Syringe Bucket GLB-60-c250
Bucket bore (ΦxL, mm) : 31.5 x 130.2
Radius(mm) : 193
Max. RPM : 5,000
Max. RCF(g-force) : 5,394
Max height for tube fit(mm) : 162

Dual Syringe Bucket GLB-d20/10-c250
Bucket bore (ΦxL, mm) : 22.5 x 100(20) / 17 x 90(10)
Max. RPM : 5,000
Max. RCF(g-force,(10/20)) : 4,472 / 4,752
Max height for tube fit(mm) : 120

Tube	
Tube capacity(mℓ)	250 mℓ conical

Tube	
Tube capacity(mℓ)	60 mℓ syringe

Tube	
Tube capacity(mℓ)	10 / 20 mℓ syringe
Radius(mm)	160/170

Angle Rotor, GRA-G-15-24

24 x 15 mℓ
∧ 45°
Hole diameter (mm) : 18
Max height for tube fit (mm) : 120

Stainless Steel 15 mℓ Sleeve GLB-15-FA
Sleeve bore(Φx h, mm) : 18 x 97.5
Radius(mm) : 175.2
Max. RPM : 4,000
Max. RCF(g-force) : 3,134

Tube						
Tube capacity(mℓ)	3	4	5	10	15	15 mℓ conical
Adaptor				None	None	None
Cat. No.	GAS-3(15)	GAS-4(15)	GAS-5(15)	-	-	-
Adaptor bore (ΦxL, mm)	13.5 x 61	13.5 x 65	13.5 x 85	-	-	-
Radius(mm)	155.2	158.2	167.2	174.5	175.5	171.5
Max. RPM	4,000					
Max. RCF(g-force)	2,776	2,830	2,990	3,121	3,134	3,068

Fixed Angle Rotor, GRF-G-50-8

8 x 50 mℓ
∧ 30°
Hole diameter (mm) : 29.5
Max height for tube fit (mm) : 127
Supplied with aerosol tight O-ring

Tube				
Tube capacity(mℓ)	10	15	15 mℓ conical	50
Adaptor				None
Cat. No.	GAS-15(50)		GAS-c15(50)	-
Adaptor bore (ΦxL, mm)	17 x 94		17 x 105	-
Radius(mm)	92.5	93.5	96	103
Max. RPM (1236R)	12,000			
Max. RCF(g-force) (1236R)	10,342	12,453	10,733	12,298

Fixed Angle Rotor, GRF-G-85-6

6 x 85 mℓ
∧ 34°
Hole diameter (mm) : 38.5
Max height for tube fit (mm) : 122

Tube						
Tube capacity(mℓ)	10	15	15 mℓ conical	50	50 mℓ conical	85
Adaptor						None
Cat. No.	GAS-15(85)		GAS-c15(85)	GAS-50(85)	GAS-c50(85)	-
Adaptor bore (Φx L, mm)	17 x 94		17 x 100	29 x 95	29.9 x 98	-
Radius(mm)	102	103	101	104	102	110
Max. RPM	10,000					
Max. RPF(g-force)	11,404	11,515	11,292	11,627	11,404	12,298

Fixed Angle Rotor, GRF-G-m2.0-24

24 x 1.5/2.0 mℓ
∧ 45°
Hole diameter (mm) : 11.1
Max height for tube fit (mm) : 56
Supplied with aerosol tight O-ring

Fixed Angle Rotor, GRF-G-m2.0-30

30 x 1.5/2.0 mℓ
∧ 45°
Hole diameter (mm) : 11.1
Max height for tube fit (mm) : 56
Supplied with aerosol tight O-ring

Tube			
Tube capacity(mℓ)	0.2	0.5	1.5/2.0
Adaptor			None
Cat. No.	GAS-m0.2(2)	GAS-m0.5(2)	-
Adaptor bore (Φx L, mm)	6.5 x 23	8 x 31	-
Radius(mm) (24/30)	67/79	73/86	84.3/96.4
Max. RPM (24/30)	12,000		
Max. RCF(g-force) (24/30)	10,786/12,718	11,752/13,845	13,572/15,520

8. Product Range

9. CE

Doc No. : STC-A10-033 / KEL10-C02044

EC Declaration of Conformity

We, **Gyrozen Co., Ltd.**
B-Station, 544-1, Bongmyeong-dong, Yuseong-gu, Daejeon 305-301, Korea
declare under our sole responsibility that the product ;

Description of Equipment : **Centrifuge**
Model Name : **1236R**

to which this declaration relates is in conformity with the following standards or other normative documents;

EN 61010-1(2001) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1 : General requirements

EN 61010-2-020(2006) Safety requirements for electrical equipment for measurement, control, and laboratory use
- Part 2 : Particular requirements for laboratory centrifuges

EN 61326-1(2006) Electrical equipment for measurement, control and laboratory use – EMC requirements

EN 55011(2007) Industrial, scientific and medical (ISM) radio-frequency equipment Radio disturbance characteristics Limits and methods of measurement

following the provisions of Directives ;

2004/108/EC Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC

2006/95/EC Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

Issued date : March 31, 2010

Confirmed by: Kim Sun Ki
Sun-Ki Kim President